



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of:

William Thomas Hatfield et al.

Serial No.: 10/813,368

Filed: March 30, 2004

For: LIGHTING SYSTEM CONDITION
MONITORING METHOD AND
SYSTEM

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Group Art Unit: 2632

Examiner: Davetta Woods Goins

Atty. Docket: 140283-1/YOD
GERD:0105

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37 C.F.R. 1.8

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April 25, 2007

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Lynda Howell

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on January 22, 2007, and received by the Patent Office on January 25, 2007.

The Commissioner is authorized to charge the requisite fee of \$500.00, and any additional fees which may be necessary to advance prosecution of the present application, to Account No. 07-0868, Order No. 140283-1/YOD (GERD:0105).

Appellants hereby request a one (1) month extension in the statutory period for submission of the Appeal Brief, from March 25, 2007 to April 25, 2007, in accordance with 37 C.F.R. § 1.136. The Commissioner is authorized to charge the requisite fee of \$120.00, and any other fee that may be required, to Deposit Account No. 07-0868; Order No. 140283-1/YOD (GERD:0105).

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1. **REAL PARTY IN INTEREST**

The real party in interest is General Electric Company, the Assignee of the above-referenced application by virtue of the Assignment to General Electric Company, recorded at reel 015172, frame 0661, and dated March 30, 2004. Accordingly, General Electric Company, as the parent company of the Assignee of the above-referenced application, will be directly affected by the Board's decision in the pending appeal.

2. **RELATED APPEALS AND INTERFERENCES**

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. **STATUS OF CLAIMS**

Claims 1-10, 12-22 and 24-34 are currently pending, are currently under final rejection and, thus, are the subject of this Appeal. Claims 11, 23 and 35 were earlier canceled.

4. **STATUS OF AMENDMENTS**

The Appellants have not submitted any amendments subsequent to the Final Office Action mailed on September 21, 2006.

5. **SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention relates generally to the field of lighting and signaling systems. *See e.g.*, application paragraph 1. More particularly, the invention relates to the monitoring and reporting of the condition of lenses and reflectors used in lighting systems, such as in railroad crossing warning equipment. *See id.*

The Application contains 6 independent claims, namely 1, 12, 19, 22, 24 and 28. The subject matter of these claims is summarized below.

With regard to the aspects of the invention set forth in independent claim 1, discussions of the recited features of claim 1 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with claim 1 provides a lamp assembly comprising a housing and a lamp disposed in the housing. A lens is disposed adjacent to the lamp. The lens comprises a conductor adapted to lose electrical continuity upon occurrence of a crack in the lens. A monitoring system is coupled to the conductor, and configured to detect the loss of electrical continuity in the conductor. A communication system transmits a signal to a remote location, representative of a state of continuity of the conductor. *See e.g.*, Application, paragraphs 24 and 25.

With regard to the aspects of the invention set forth in independent claim 12, discussions of the recited features of claim 12 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with claim 12 provides a kit for monitoring status of a lighting system including a lens. A conductor is disposed in a region of the lens. The conductor is adapted to lose electrical continuity upon occurrence of a crack in the lens. A communication system transmits a signal to a remote location, representative of a state of continuity of the conductor. *See e.g.*, Application, paragraph 33.

With regard to the aspects of the invention set forth in independent claim 19, discussions of the recited features of claim 19 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with claim 19 provides a method for monitoring status of a lighting system including disposing a lens in a lamp assembly. A conductor is disposed over a desired region of the lens. The conductor is adapted to lose electrical continuity upon occurrence of

a crack in the lens. A conductive path is monitored for a loss in electrical continuity. An output signal is provided to a location remote from the lighting system, the output signal providing an indication of the operational state of the lens. *See e.g.*, Application, paragraph 27.

With regard to the aspects of the invention set forth in independent claim 22, discussions of the recited features of claim 22 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with claim 22 provides a method for monitoring status of a lighting system. The method includes monitoring a state of continuity of a conductor coupled to a lens in a lamp assembly. The continuity is interrupted by a crack in the lens. A signal is generated in response to loss of continuity of the conductor indicative of occurrence of a crack in the lens. An output signal is provided to a location remote from the lighting system, the output signal providing an indication of the operational state of the lens. *See e.g.*, Application, paragraphs 27 and 37.

With regard to the aspects of the invention set forth in independent claim 24, discussions of the recited features of claim 24 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with claim 24 provides a crack detection lens configured for detecting cracks, including a lens disposed adjacent to a lamp and a conductor disposed in a region of the lens. The conductor is adapted to lose continuity in response to formation of a crack in the lens. The conductor comprises a plurality of leads configured to be coupled to a monitoring system and to provide a signal to a remote location representative of a state of continuity of the conductor. *See e.g.*, Application, paragraphs 27, 29 and 30.

With regard to the aspects of the invention set forth in independent claim 28, discussions of the recited features of claim 28 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in

accordance with claim 28 provides a system for monitoring status of a lighting system. The system includes a lamp assembly comprising a housing and a lamp disposed in the housing. A lens is disposed adjacent to the lamp. A reflector is also disposed adjacent to the lamp. The reflector comprises a reflector conductor adapted to lose electrical continuity upon occurrence of a crack in the reflector. A monitoring system is coupled to the reflector conductor and configured to detect the loss of electrical continuity in the reflector conductor. A communication system transmits a signal to a remote location, representative of a state of continuity of the reflector conductor. *See e.g.*, Application, paragraph 37.

A benefit of the invention, as recited in these claims, is the ability to automate a process of inspection of lighting and signaling systems to alleviate the problems associated with the mandated manual inspection. Also, condition of the lighting and signaling systems can be known at all times to enable the correction of defects found in the lens and reflectors immediately, thus reducing the time to repair and improving maintenance. The prior art references do not recognize the need or utility of automated processes of inspection of lighting and signaling systems.

6. **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

Sole Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's rejection of claims 1-10, 12-22 and 24-34 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,182,432 (hereinafter "Lange") in view of U.S. Patent 6,794,882 (hereinafter "Jessup") and in view of U.S. Patent 6,150,927 (hereinafter "Nesbitt").

7. **ARGUMENT**

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under Section 103. Accordingly, Appellants respectfully request full and favorable consideration by the

Board, as Appellants strongly believe that claims 1-10, 12-22 and 24-34 are currently in condition for allowance.

A. **Judicial precedent has clearly established a legal standard for a *prima facie* obviousness rejection.**

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (B.P.A.I. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes all of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

B. **The Examiner's rejection of independent claims 1, 12, 19, 22, 24 and 28 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

1. **Summary of the Reference Teachings.**

a. **Lange**

Lange discloses a circuit arrangement for a *motor vehicle headlight* with at least one electrically conductive heating element mounted on or in an enclosing light-

transmissive shield. A switching-on apparatus allows for powering the heating element to avoid coating and ice build-up to and provide crack-monitoring of the light transmissive shield by coupling of the heating element with an analyzing apparatus.

Appellants submit that Lange fails to teach or suggest transmitting a signal indicative of a loss of electrical continuity in a conductor to a remote location. In fact, there is no teaching or disclosure of raising an alert or alarm in Lange. Instead, Lange teaches that upon detection of a crack, the power supply unit of the high pressure discharge lamp is switched to provide no further current to prevent life threatening injuries due to high voltage conducting parts of the motor vehicle headlight becoming accessible upon cracking of the light transmissive shield. *See e.g.*, Lange, column 3, lines 3-15. An alert to a remote location will not serve the purpose of the monitoring system of Lange as remedial action is required to be taken immediately, and as envisioned by Lange, automatically. Even possible notification or alert to the person of interest, the driver, is not explicitly taught or suggested by Lange.

b. **Jessup**

Jessup discloses a *rupture detector for a windshield assembly* having one or more transparent members. The rupture detector includes a conductive member attached to a portion of the transparent member. Additionally, Jessup discloses an *alarm mechanism, such as an audio or visual alarm* that is configured to initiate an alarm action in response to a crack in the windshield assembly.

While Jessup discloses initiating an alarm in response to a crack, Appellants stress that Jessup fails to suggest or teach transmitting a signal indicative of a loss of electrical continuity in a conductor to a remote location. Here again, because Jessup relies upon the alarm, no signal is sent to any remote location. *See e.g.*, Jessup, column 1, lines 34-49. Clearly, the alarm is intended to help initiate immediate measures such as stopping the vehicle to prevent injury to the operator or driver, and to passengers in a vehicle. The

Jessup alarm, even if transmitted to a remote location, would fail to serve the purpose of the rupture detector as envisioned by Jessup as remedial measures, such as stopping the vehicle have to be performed by the driver.

c. **Nesbitt**

Nesbitt teaches an *anti-vandalism detection and alarm system* for detection and reporting the scratching of relatively hard materials which generate characteristic sound or vibration frequencies during scratching; and detecting and reporting the cutting and slashing of relatively soft materials. In addition, Nesbitt teaches activating a radio to broadcast an alarm report to a reporting device that is remote from the vehicle, where the *alarm report is indicative of an act of vandalism*.

Appellants stress that it is not surprising that an anti-vandalism detection system would transmit an alarm signal to a remote location. Accordingly, Appellants stress that while Nesbitt teaches an anti-vandalism detector such as methods and systems for detecting breakage and defacing of materials such as glass and plastic, there is no suggestion in Nesbitt of detection of a crack in a lens. That is, Nesbitt *does not consider breakage of a headlamp as warranting remote communication as it does not constitute intrusion or vandalism*.

2. **The Claimed Subject Matter.**

The pending claims recite systems and methods for monitoring the condition of a lighting system, such as a railroad signal lens. The system and method include transmitting or providing *a signal to a remote location, representative of a state of continuity of the conductor or indicative of the operational state of the lens*. For embodiments such as for railroad signal lens monitoring, the transmission and communication of the condition of the lighting system to a remote location where an observer may be located, is important as it can enable replacement of a cracked railroad signal lens or reflector or other remedial action, when necessary.

The Board should bear in mind the unique context of the invention. Railroad signaling systems are by their nature remote and generally unmanned. Sensing cracks as claimed, and communicating operational states to a remote location are especially useful. Such monitoring simply did not exist prior to the invention. Indeed, as the references themselves indicate, such monitoring also did not exist in other applications, such as for vehicle headlamps.

3. **There is no Reasonable Basis for the Hypothetical Combination Proposed by the Examiner.**

The Examiner stated in the Advisory Action that because Lange includes switching on Apparatus E to notify the driver of the vehicle of a cracked lens, this somehow underlines the need to alert persons of interest of the cracked lens. The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Jessup of initiating an alarm upon rupture of a lens, with the teaching of Nesbitt of transmitting an alarm condition to a remote location, to ensure that the driver, whether near the vehicle or not, is aware of vandalism that has taken place with the vehicle.

This combination is not supported by references. Even assuming an alert is raised in Lange, the person of interest in Lange, as the Examiner acknowledges, is the driver, and the driver may be alerted by the monitoring system. Crack monitoring of the light transmissive shield in Lange would likely fall within a category of monitoring for conditions such as an open/close state of a car door, an open/close state of a car trunk, or low fuel level monitoring, and so forth. For such systems, the vehicle driver is the person who is a natural recipient of the information as he or she is best positioned to take remedial action, if and when necessary. The alert would likely only be raised within the car and not at a remote location. More than an alarm being raised, Lange is concerned with monitoring and initiating an automatic current interruption.

Lange does not suggest or contemplate the possibility of transmitting or communicating a signal to a remote location, representative of a state of the motor vehicle headlight. Lange does not envision an apparent need or usefulness for communicating such information to a remote location. Therefore, not only does Lange not teach or suggest remote monitoring or communication of a lighting system condition to a remote location but also there is *no clear desirability to make the proposed modification to Lange*. Such a desirability or motivation would be mere conjecture without any support in Lange reference and would, in fact, be antithetical to the teachings of Lange.

Jessup, while disclosing a mechanism configured to initiate an alarm action in response to a crack in the windshield assembly, also fails to suggest or teach transmitting a signal indicative of a state of the lighting system to a remote location. As discussed above, the Jessup alarm, if transmitted to a remote location, again would fail to serve the purpose of the rupture detector envisioned by Jessup. The alarm is intended to help initiate immediate measures such as stopping the vehicle to prevent injury to the operator or driver, or to the passengers in a vehicle. Again, any purported desirability to modify Jessup for transmission of an alarm to a remote location is simply inconsistent with the teachings of Jessup and with the context of the Jessup system.

Nesbitt teaches activating a radio to broadcast an alarm to a reporting device that is remote from the vehicle, where the *alarm report is indicative of an act of vandalism*. While Nesbitt may teach broadcasting an alarm to a device remote from the vehicle, there is no suggestion in Nesbitt to relate to detection of a crack in a lens. That is, and importantly, *Nesbitt does not consider breakage of a headlamp as warranting remote communication as it does not constitute intrusion or vandalism*. It is the Examiner's duty to establish this extension of the teachings of Nesbitt to support a *prima facie* case. To date, the Examiner has simply failed to do so.

Appellants contend that absolutely no suggestion or motivation can reasonably be advanced for combining the references. In essence, the Nesbitt approach to sounding an alarm to combat *vandalism* is not only grossly unnecessary for the Lange headlight crack indicator, which one skilled in the art would liken to low fuel alarms, low tire pressure alarms, door ajar alarms and the like.

Conclusion

In view of the considerations summarized above, Appellants submit the Examiner has failed to establish *prima facie* obviousness of claims 1, 12, 19, 22, 24 and 28. Accordingly, Appellants respectfully submit that independent claims 1, 12, 19, 22, 24 and 28, and claims depending therefrom are allowable and the Appellants respectfully request that the Board overturn the Examiner's rejections on this ground.

Respectfully submitted,

Date: 4/25/2007

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8. **APPENDIX OF CLAIMS ON APPEAL**

Listing of Claims:

The following listing of the claims is provided in accordance with 37 C.F.R. 1.121.

1. A system for monitoring status of a lighting system, the system comprising:
 - a lamp assembly comprising a housing and a lamp disposed in the housing;
 - a lens disposed adjacent to the lamp, the lens comprising a conductor adapted to lose electrical continuity upon occurrence of a crack in the lens;
 - a monitoring system coupled to the conductor and configured to detect the loss of electrical continuity in the conductor; and
 - a communication system for transmitting a signal to a remote location, representative of a state of continuity of the conductor.
2. The system of claim 1, wherein the lens comprises glass.
3. The system of claim 1, wherein the lens comprises a moldable polymeric material.
4. The system of claim 1, wherein the lens is sealed to the housing.
5. The system of claim 1, wherein the conductor comprises a conductive wire.
6. The system of claim 1, wherein the conductor comprises a decal configured to be disposed on a surface of the lens.

7. The system of claim 1, wherein the conductor is embedded in the lens.
8. The system of claim 1, wherein the conductor defines a continuous path disposed over a desired region of the lens.
9. The system of claim 8, wherein the region comprises a central region of the lens.
10. The system of claim 8, wherein the region comprises a peripheral region of the lens.
12. A kit for monitoring status of a lighting system, the kit comprising:
a lens;
a conductor disposed in a region of the lens, wherein the conductor is adapted to lose electrical continuity upon occurrence of a crack in the lens; and
a communication system for transmitting a signal to a remote location, representative of a state of continuity of the conductor.
13. The kit of claim 12, wherein the lens comprises glass.
14. The kit of claim 12, wherein the lens comprises a moldable polymeric material.
15. The kit of claim 12, wherein the conductor comprises a conductive wire.
16. The kit of claim 12, wherein the conductor comprises a decal configured to be applied to a rear surface of the lens.

17. The kit of claim 12, wherein the region comprises a central region of the lens.

18. The kit of claim 12, wherein the region comprises a peripheral region of the lens.

19. A method for monitoring status of a lighting system, the method comprising:

disposing a lens in a lamp assembly;

disposing a conductor over a desired region of the lens, the conductor adapted to lose electrical continuity upon occurrence of a crack in the lens;

monitoring the conductive path for a loss in electrical continuity; and

providing an output signal to a location remote from the lighting system, the output signal providing an indication of the operational state of the lens.

20. The method of claim 19, wherein disposing the lamp in the lamp assembly comprises sealing the lens in a lamp housing.

21. The method of claim 19, wherein monitoring the conductive path comprises coupling the conductor to an electrical monitoring system configured to apply a monitoring signal to the conductor during operation.

22. A method for monitoring status of a lighting system, the method comprising:

monitoring a state of continuity of a conductor coupled to a lens in a lamp assembly, wherein the continuity is interrupted by a crack in the lens;

generating a signal in response to loss of continuity of the conductor indicative of occurrence of a crack in the lens; and

providing an output signal to a location remote from the lighting system, the output signal providing an indication of the operational state of the lens.

24. A crack detection lens configured for detecting cracks comprising:
a lens disposed adjacent to a lamp; and
a conductor disposed in a region of the lens, wherein the conductor is adapted to lose a continuity in response to formation of a crack in the lens, the conductor comprising a plurality of leads configured to be coupled to a monitoring system and to provide a signal to a remote location representative of a state of continuity of the conductor.

25. The crack detection lens of claim 24, wherein the conductor comprises a conductive wire.

26. The crack detection lens of claim 24, wherein the region comprises a central region of the lens.

27. The crack detection lens of claim 24, wherein the region comprises a peripheral region of the lens.

28. A system for monitoring status of a lighting system, the system comprising:
a lamp assembly comprising a housing and a lamp disposed in the housing;
a lens disposed adjacent to the lamp;
a reflector disposed adjacent to the lamp, the reflector comprising a reflector conductor adapted to lose electrical continuity upon occurrence of a crack in the reflector;
a monitoring system coupled to the reflector conductor and configured to detect the loss of electrical continuity in the reflector conductor; and
a communication system for transmitting a signal to a remote location, representative of a state of continuity of the reflector conductor.

29. The system of claim 28, further comprising a conductor disposed on the lens and adapted to lose electrical continuity upon occurrence of a crack in the lens, and a monitoring system coupled to the conductor and configured to detect the loss of electrical continuity in the conductor.

30. The system of claim 28, wherein the reflector comprises glass.

31. The system of claim 28, wherein the reflector comprises a moldable polymeric material.

32. The system of claim 28, wherein the reflector conductor comprises a conductive wire.

33. The system of claim 28, wherein the reflector conductor is configured to be disposed on a rear surface of the reflector.

34. The system of claim 28, wherein the reflector conductor is configured to define a continuous path disposed over a desired region of the reflector.

9. **EVIDENCE APPENDIX**

None.

10. **RELATED PROCEEDINGS APPENDIX**

None.